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ABSTRACT

In a holistic approach to education, the various parts are related to the whole in such a way that education is no longer fragmented and unrelated to the larger society. Because it is difficult to define what is meant by the term "holistic," educators have been hesitant to use such an approach even though a growing body of literature supports the validity of such educational concepts. Holistic education emphasizes the need to develop a sensitivity to the process of one's own thoughts and feelings, and those of others. Implicitly and explicitly, holistic education emphasizes the common humanity of all people and the essential unity of life. Buckminster Fuller, Fritjof Capra, Lewis Thomas, David Bohm, and E. F. Schumacher have all discussed the need for a more holistic approach to life and education. Educators, however, have avoided dealing with interconnections among phenomena and people, preferring to maintain boundaries between disciplines and avoiding personal matters altogether. What is needed is a holistic approach that emphasizes those interconnections and could even provide the basis for a new approach to teaching values. (IS)

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Towards a Holistic Paradigm for Education:

A Communications Approach

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presented to the

American Educational Studies Association
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Towards a Holistic Paradigm for Education

A Communications Approach

"I point out to you, Marcus Clair Luyseyal, a lesson from past over-machined societies which you appear not to have learned. The devices themselves condition the users to employ each other the way they employ machines."

--Leto II

God Emperor Of Dune

by Frank Herbert

I

A holistic paradigm for education could do much for humanity. Let us define both "holism" and "paradigm." The Random House Dictionary of the English Language, The Unabridged Edition defines "holism" as "n. Philos. the theory that whole entities, as fundamental components of reality, have an existence other than as the mere sum of their parts." The relevant definition of "paradigm," taken from the same source, is "an example; pattern." Webster's Seventh New Collegiate Dictionary defines "holistic" as "emphasizing the organic or functional relation between parts and wholes." A holistic paradigm for education, therefore, is a "pattern" (or "system") of education in which the parts are "related to the whole" in both form and content.

If "related to the whole" could be quantified, the notion of a holistic paradigm for education might potentially improve our school system. By its very definition, however, "holistic education" defies such traditional objective definitions. So this notion has not, in general, been accepted by many academicians. Yet a growing body of literature supports the validity of holistic concepts in education.

R. Buckminster Fuller has given us one of the basic holistic concepts: Spaceship Earth. We are travellers, mutually interdependent upon ourselves and our craft for our survival, hurtling through space at 60,000 miles per hour.[1] This metaphor affords an easily conceived, albeit non-scientific, holistic framework for comprehensively addressing growing problems in the production of food, energy, and housing on Earth.[2] More to the point here, the image of Spaceship Earth is a powerful one which not only concisely illustrates, but demands, a holistic social, economic, ecological, and educational perspective.

I shall attempt to both define and suggest philosophical changes to achieve the goal of a holistic model for education. I shall, further, attempt to transmit an overview--a "feel" for what is and what is not holistic education based on the literature and my own experience. A number of specific conclusions (guidelines) towards a holistic education will be advanced.

II

The educational philosophies underlying educational planning are often not explicitly stated by the participants. Yet the value of any educational study, whether of curriculum, administration, counseling, or whatever, rests solidly on the philosophical frame of reference--the perspective--which it assumes.

Concerning the formation and transformation of perspectives in general, Thomas S. Kuhn, in The Structure of Scientific Revolutions, convincingly demonstrates that the theoretical or conceptual models we hold as truths--and through which we perceive reality--are, in actuality, the latest in a series of intermittently appearing "paradigms." In science, the transition from Aristotelian to Galilean and from Galilean to Newtonian world views are examples. Elucidation of the notion, as well as the means, of "paradigm shift" is the subject of Kuhn's book. The earth was, after all, moving all along; but only after Copernicus was the fact generally recognized. It was a shift in consciousness.

The process of shifting basic scientific theories occurs when anomalies accumulate to the point where the currently predominant paradigm can no longer explain observable phenomena. When a new theory is successful in explaining hitherto inexplicable scientifically accumulated phenomena, a scientific revolution gradually occurs. But Kuhn also points out that the imperatives and mechanics of paradigm shifts are not unique to the physical sciences. He claims that these processes are applicable to other fields as well; indeed, they are borrowed from other fields such as literature, the arts, and political development.[3]

Due to the work of Fuller and others (some of whose ideas will be explored in this paper), there is considerable evidence suggesting that the holistic paradigm is indeed proving itself in addressing and resolving many crucial problems both in the physical and social sciences.[4]

According to Fritjof Capra (a nuclear physicist at the University of California at Berkeley and the author of The Tao of Physics and The Turning Point), our current social, political, economic, and ecological

plights are all manifestations of a broader cultural crisis brought about by adherence to outdated conceptual models.[5] He urges us to consider more than the Cartesian-Newtonian reductionist approach to reality. Reductionism is the conception of reality which holds that matter is the basis of all existence and that the material world is composed of a multitude of separate objects assembled into a huge machine. It assumes that complex phenomena can always be understood by reducing them to their basic building blocks.[6]

Capra utilizes recent discoveries in quantum physics to show that "reality" can only be understood in terms of process. He demonstrates that at the sub-atomic level (i.e., at the level of the fundamental "building blocks" of our universe) matter itself is "fluid" and is inextricably interwoven with and embedded in consciousness itself.[7]

In The Turning Point, Capra's basic thesis is that science and society are undergoing a fundamental paradigm shift (of the type described by Kuhn). He believes that quantum physics demonstrates a shift from the static Cartesian view to the viewing of the relationships and interaction of systems, from purely quantitative to more qualitative.[8]

The main point here is that the evidence of modern physics both heralds and reflects the validity of the paradigm shift. Capra insists that physics, the "hardest" of all sciences, can only be understood in terms of its interrelated systems--thus transcending the seventeenth-century reductionist views of Descartes and Newton. The term "systems view" refers to the realization of the validity of the fluidity of systems. In general, the terms "systems view," "organic view," and "non-linear" or "holistic approach" all refer to the same holistic concept but emphasize different aspects of the whole. The image of nature changed

from organism to machine with the advent of the Cartesian paradigm and along with it the value system changed from one conducive to ecological behavior to one conducive to scientific/mechanistic domination over nature.[9]

Capra states that the systems view of life is "...based on awareness of the essential interrelatedness and interdependence of all phenomena--physical, biological, psychological, social, and cultural."[10] Given that the now-transcended Cartesian/Newtonian paradigm is the one from which our Western social sciences have evolved, let us now begin to examine the validity of a holistic approach in the humanities as well. Indeed, dealing with the "sciences" and "humanities" themselves as "separate areas of discipline"--from at least this holistic perspective--has lost its former relevance.[11] Capra is careful, however, not to invalidate Cartesian reductionism totally because Newtonian equations prove to be special cases in the more comprehensive quantum physics. He therefore simply says that the parameters of its usefulness do not encompass the total picture in any domain of more complete inquiry.

Along this same line, Lewis Thomas's understandings in biology parallel those of Capra's with respect to the paradigm shift just described. Thomas's holistic view of the Earth is powerfully and poetically reflected in his statement that "it is most like a single cell."[12] Likewise, E.F. Schumacher in Small Is Beautiful applies these "organic" and non-linear understandings to the field of economics. He writes that it is inherent in the methodology of economics to ignore human's dependence on the natural world. But he says, "...we may expect that economics must derive its aims and objectives from a study of man, and that it must derive at least a large part of its methodology from a study of nature." In contrast to current economic wisdom which mandates

the maximization of profits, in Schumacher's view "...the conclusions and prescriptions of economics change as the underlying picture of man and his purpose on earth changes." Schumacher's economic views are clearly sensitive to their "relations to the whole."[13]

At this point, another physicist's view of this concept of "relatedness to the whole" can be appreciated. The following remarks by David Bohm, whose writings are referenced in both of Capra's books, also serve to highlight the significance of holistic education. Bohm, in Wholeness and the Implicate Order writes:

> What I am proposing here is that man's general way of thinking of the totality, i.e. his general world view, is crucial for overall order of the human mind itself. If he thinks of the totality as constituted of independent fragments, then that is how his mind will tend to operate, but if he can include everything coherently and harmoniously in an overall whole that is undivided, unbroken, and without border (for every border is a division or break) then his mind will tend to move in a similar way, and from this will flow an orderly action within the whole.
>
> Of course...our general world view is not the only factor that is important in this context. Attention must, indeed, be given to many other factors, such as emotions, physical activities, human relationships, social organizations, etc., but perhaps because we have at present no coherent world view,

> there is a widespread tendency to ignore the psychological and social importance of such questions almost altogether. My suggestion is that a proper world view, appropriate for its time, is generally one of the basic factors that is essential for harmony in the individual and in society as a whole.[14]

Bohm's work, too, provides an objective rationale--quite aside from the intuitive one--for a more holistic approach to life. Both Capra and Bohm, however, remind us that some of these concepts are not yet accepted by the majority of physicists. But as Capra writes, "Every contemporary physicist...will accept the main theme...that modern physics has transcended the mechanistic Cartesian view of the world and is leading us to a holistic and intrinsically dynamic conception of the universe."[15] As Bohm sees it:

> One may suggest...that we are in a position which is in certain ways similar to where Galileo stood when he began his inquiries. A great deal of work has been done showing the inadequacy of old ideas, which merely permit a range of new facts to be <u>fitted mathematically</u> (comparable to what was done by Copernicus, Kepler, and others), but we have not yet freed ourselves thoroughly from the old order of thinking, using language, and observing. We have thus yet to perceive a new <u>order</u>.... When we see the new basic differences, then (as happened with Newton) we

will be able to perceive a new universal ratio or reason relating and unifying all the differences. This may ultimately carry us as far beyond quantum theory and relativity as Newton's ideas went beyond those of Copernicus.[16]

III

The paradigm shift is basic and we as educators are not broadly informed on the matter. As a consequence, our educational systems have not been equipping people with sufficient examined experiences about this relevant new perspective.

Life demands that people have some knowledge in areas which are common to all. This is why the 3 R's are taught. Yet many universally important areas of concern are either taboo or otherwise absent from our educational surroundings. For example, education that has not found its "relations to the whole" does not seem to encourage (nor even allow) discussion of the complex and controversial areas basic to one's own sense of survival and happiness. I don't know why, but classroom experience confirms this: that, although there are some historical and present-day exceptions, the interpersonal questions regarding values, religion, politics, family, divorce, sex, money, and competition are discouraged in education in the U.S. despite their widespread relevance and continuous demand for expertise in addressing them.

Traditionally, too, our education system does not consider that there are world views, or what some of these might be. A "world view" is supplied in advance of one's arrival into the system; however, we are not so informed. In this respect our education is certainly not "related to

the whole," for these concepts are not delineated. The relevance to our culture of the lack of such relatedness was highlighted by Bohm. On the same theme Ivan Illich writes, "So pervasive is the power of the institutions we have created that they shape not only our preferences, but actually our sense of possibilities."[17]

Amidst all of the reductionistic trees being thrown at children from all angles, a practical question now emerges: Just when and where is a growing child afforded the opportunity to perceive a forest, or even to learn one exists? For example, in school we may acquire knowledge of various political parties and systems. In some classrooms students may even delve into currently relevant topics (compared with learning about government and politics from a traditional textbook). But that we must be politicized for optimum survival, or that we must sit in rows to learn in the first place, is rarely questioned. But it should be.[18]

Of course it can be argued that there is not even enough time or resources to adequately teach the 3 R's, much less turn classrooms into purely speculative (or some type of encounter group) sessions for part of the day (i.e., with all this "questioning" being advocated). Or it can be argued that "interpersonal" issues are not the proper domain of public education, or that the 3R's themselves are the proper tools to enable people to determine and make their own "relations to the whole" because there is no single universal "whole" that is perceived as such by all people--in other words, that the 3 R's are the tools through which people can exercise free will to explore the themes they want throughout life.

Encounter therapy is not being suggested here. But at the same time I do not believe that knowledge of the 3 R's alone, given today's media-saturated society coupled with today's eclectic sytles of family and religious life, is sufficient to ensure or even encourage the child's development of an enlightened "free will," a will in which the incredible power of human comprehensiveness is accomodated.

Education must expose the tools and "construct"-tion blocks themselves to make the "relation between parts and wholes." An analogy would be the way in which magicians forthrightly and slowly unfold their tricks of illusion. In this way we could inspect the "pre-packaging" of paradigms (out of which our cultures arise). This translates into other more tangible levels as well. As Illich says, "The more the citizen is trained in the consumption of packaged goods and services, the less effective he seems to become in shaping his environment. His energies and finances are consumed in procuring ever new models of his staples, and the environment becomes a by-product of his own consumption habits."[19]

Lack of connectedness is exacerbated by the communications media (particularly T.V.) where the same themes of violence, politics, religion, money, sex, etc., are invariably placed in adversarial settings of competition/survival/power. It is important to note that communications through electronic media, and communication between friends about subjects related to media content, comprise a vast amount of the time and interest of our youth.[20] Not only programs, we must also include commercials--state-of-the-art consumer psychology coupled with sophisticated production techniques--in considering both the quantity and quality of the impact and interaction of dichotomous themes with our lives.

So, whereas life demands a measure of expertise in areas that are unaddressed in childrens' educational surroundings on one hand, a growing child's desire for "certainty" and a "fulfillment" in these same areas is constantly being whetted, on the other, by the communications media (particularly T.V., movies, some music, and advertising). In this milieu of disconnections it is indeed, as Illich states, that our sense of possibilities is shaped for us.

That education can and should be explicitly linked to the relative health of society is logically and succinctly expressed by Gerhard Hirschfeld, who, in An Essay On Mankind, writes, "If the welfare of mankind is the primary purpose of inquiry, then it is also the only yardstick by which to measure the value of education."[21] Since "the welfare of mankind" is one of the implicit goals of education in the U.S., it is also legitimate that holistic education attempt to redress disconnections that work against that welfare. Let us examine a few more examples of the disconnections being referred to.

The constant restimulation in the media of the same "interpersonal" themes which are pointedly avoided in our education may constitute one possible explanation for the increasing number of people who turn to one or more "alternative" (outside of traditional academic frameworks) self-help/communication/education groups. There are literally hundreds of such groups in the Los Angeles area alone, many with national and international affiliations or franchises.[22]

Sociologist James T. Richardson, a contributor to a report called "Cults and the Constitutuion" published by the Center for the Study of Democratic Institutions, writes that "the brainwashing view of why and how people join new religious groups does not mesh well with facts"--that

whereas people do affiliate and disaffiliate in a "conversion career" (of trying out alternative life-styles), they also join for the care and the sense of community and love that is usually present in these groups.[23] Many of these groups--aside from the ones identified specifically as religions--seem to offer a spiritual dimension. Leaving aside the obvious financial and political issues surrounding portions of the "spiritual marketplace,"[24] one glaringly obvious and powerful common denominator of the "new religions" and alternative therapies is that they all invariably provide, in some form, someone to listen to one's story--some relevant interpersonal communication, some connection to one's own life. People often have their "own story" that apparently has "never been told" to parents or teachers. But the guru listens--or appears to. That one's undelivered communications have profound psychological impact is evidenced, in part, by the vast popularity of the therapy ("We listen!") movement itself.

Rollo May, noted psychoanalyst and author, writes that "[ours] is a world in which, amid all the vastly developed means of communication that bombard us on all sides, actual personal communication is exceedingly difficult and rare."[25] May writes that men and women are alone in a world in which they are never known.[26] Yet we are literally surrounded and besieged by "communication" from all quarters. That a general condition of psychological and sociological disconnection exists is also illustrated by the following examples.

Consider the "audio" of video games, whether in the arcade or home. Out of all possible sound effects for computer games, what is employed is a vast array of electronically simulated explosions and zap-rays--a digital carry-over from the "pow" and "blam" of our traditional Saturday

morning cartoons. The children are exposed to explosions and disconnections on the T.V. news, in much of the music, and in their games. Disconnections may be normal in the real world but this doesn't mean we should reinforce them.

Another current, and thought-provoking, example of urban psychological and sociological disconnection is slam-dancing. Slam dancing has been in the punk rock clubs for several years,[27] but more recently a populazized version of it has appeared. In this dance, bodies are literally careening around the floor while slamming into and off of one another. It is danced alone--on packed dance floors. If ever a popular activity reflected the greater societal milieu (as perceived by many of our youth), including of course the isolation referred to by Rollo May, slam-dancing is one.

In yet another manifestation of disconnection, but extended to global realities and imperatives, Buckminster Fuller writes:

> The computer will show 70 percent of all jobs in America and probably an equivalently high percentage of the jobs in other Western private-enterprise countries are pre-occupied with work that is not producing any wealth or life-support--inspectors of inspectors, re-underwriters of insurance reinsurers. Obnoxico promoters, spies and counter-spies, military personnel, gunmakers, etc.[28]

By way of further illustrating some of these same concepts, but also to point the way towards some conclusions or guidelines about holistic education, some more examples of psychological and sociological disconnection taken from the field of education may be considered.

I have already suggested that our children are having difficulty equipping themselves with certain philosophical and psychological skills needed to cope with life. But what about less abstract skills? I wonder, for example, if a recent high school graduate can recognize when water is unsafe to drink. There is ample evidence, both in the literature and in our own neighborhoods, supporting the notion that a basic education should include some expertise in this area.[29]

There is evidence to be found daily in newspapers suggesting that one's everyday knowledge should include recognition that environmental trends which have been proven harmful are being reinforced by official policies.[30] There are probably very few of us that know how to survive for a month, find or prepare good water, or grow food. Yet many "uncivilized" (much less "educated") tribal people know. These cannot be said to be "unnecessary skills" in today's American society.

I am not advocating "survivalism." But some of the notions and skills basic to preserving life itself are in danger of becoming "esoteric" knowledge. It has become exceptional to be able to locate or provide for oneself basic commodities such as food and water, which are literally everywhere. In an extention of this thought, there are many vernacular values and activities (for example, regarding food, medical care, and education) that have become luxuries.[31]

IV

Importantly, both as a cause and result of these types of disconnections (and these are not the only factors involved), education at many of our most advanced institutions has become self-defeating.[32] The educational system, for instance, through lack of providing a living, relevant education to children, frequently causes boredom, discipline problems, and distaste for further scholarship.[33] Interpersonal communication and holistic education seem to interface as mutual underpinnings in this context.

As I have illustrated, in our traditional educational systems we are not only expressly taught to keep away from the very "interpersonal" themes which are associated with the emotional encounters and survival connections of life (and in which we most need to acquire functional expertise), we are also conditioned away from all but the most ritualized interpersonal communication with our teachers. This is not indicative of an educational philosophy which recognizes the holistic reality of life. In contrast, Paulo Freire's experiences indicate that far better results are obtained when the approach is holistic and the education more comprehensive.[34]

In contrast to the work of Freire (among others) in education, and the radical new paradigm shift arising from modern physics, our educational system generally still perceives social studies, philosophy, physics, anthropology, psychology, economics, sociology, education, ecology, political science, health, and therapy as "separate disciplines." Of course in a sense they are, but in education the natural gestalt is left unidentified and unaddressed as such.[35] For example, the perspective taken by this paper loses meaning if we try to separate its "sociology" from "psychology" or its political implications. The

importance of the work of David Bohm, Buckminster Fuller, and Fritjof Capra is that they provide an objective defense for the notion that any practical application of these "disciplines" requires a recognition of their mutual underpinnings and overlappings. "Soley economic measures" never are. The new physics is objectively defining holism.

Holistic education is education that has found its relations to the whole. It is based upon a paradigm provided by science and nature. A word of explanation is, however, in order here. Just as there are different orders of variables comprising communication (the hardware it employs, its subject matter, and the underlying attitude with which the interpersonal communications are communicated), holistic education refers to holistic subject matter in appropriate unions with holistic teaching (examples of both will follow).

Holistic education does not necessarily depend upon rearranging existing educational infrastructures or curriculum. One educator writes, "The Holistic paradigm does not possess assumptions which are necessarily opposed to those of the other paradigms. Rather, it regards the assumptions and research findings of the other paradigms as parts of a more inclusive whole."[36] But an attitude of relevance, of "relatedness to the whole" must appear.

So, increasing one's personal "data base" through educational inquiry should be accompanied by the development of an authentic <u>conceptual base</u> through which viable premises can be identified. The following are simply some basic guidelines towards a holistic paradigm for education:

1. Holistic education specifically addresses holistic subject matter. Some examples of these are the Spaceship Earth (world view) perspective to ecology, energy, agriculture, and economics; observable natural ecological relationships (such as the effects of deforestation or aquifer contamination), including the study of the consequences of violating them; and the subject of interpersonnal communication itself, its role and efficaciousness in life. Holistic education encompasses global education.[37]

2. Holistic education includes the use of holistic teaching. Holistic "methods" relate and enable students to relate all subject matter "to the whole".[38] I know of no particular codified methods of teaching which accomplish this but suspect that a pivotal role is played by interpersonal communication and the necessity of getting the "feel" of the concept of holistic education.

3. Holistic education is related (but not restricted) to the here and now, to one's everyday life. It encompasses one's unique, meaningful thematics in life.[39]

4. Holistic education encompasses the systems view of life.[40]

5. Holistic education includes an examination of the subject of holistic education itself and its importance. It transmits holistic values but it does not necessarily have to do it explicitly. Holistic values are inherent in holistic education.

6. Two entrance points to holistic education are interpersonal communication and concentration on environmental awareness. Holistic education teaches about current threats to our well-being such as acid-rain, topsoil erosion and desertification, aquifer contamination, deforestation, plutonium waste management, nuclear proliferation, and others. It teaches attention to consequences.

7. Holistic education emphasizes the need to develop a sensitivity to the process of one's own thought and feelings, and those of others. Such awareness is integral to interpersonal communication about life.

8. Holistic education implicitly and explicitly emphasizes the common humanity of all people and the essential unity of life.

I believe that holistic subject matter should receive as much concentration as each of the 3 R's and that holistic teaching methods (holistic attitudinal orientation) should permeate all teaching. A holistic paradigm, by definition, provides a logical and comprehensive framework for doing so.

Also, the holistic model is suggestive of definite values, and for this reason alone a holistic paradigm for education could do much for humanity. Abraham Maslow believed the ulitimate disease of our time to be valuelessness. He wrote:

> The cure for this disease is obvious. We need a validated, usable system of human values, values that we can believe in and devote ourselves to because they are true rather than because we are exhorted to "believe and have faith."

> And for the first time in history, many of us feel, such a system--based squarely upon valid knowledge of the nature of man, of his society and of his works--may be possible.[41]

Maslow wrote these words sometime prior to 1960. The more recent works by Bohm and Capra would give Maslow even more reason to feel the way he does. Maslow defends the teaching of values in education with the following:

> ...the teaching of spiritual values or ethical and moral values definitely does (in principle) have a place in education, perhaps ultimately a very basic and essential place, and...this in no way needs to controvert the American separation between church and state for the very simple reason that spiritual, ethical, and moral values need have nothing to do with any church. Or perhaps, better said, they are the common core of all churches, all religions, including the non-theistic ones.[42]

Holistic values (valuing the whole) satisfy the current crushing need for a "system" of values in education which can legitimately resist charges of de-secularization. Stated another way, I believe that a holistic paradigm for education provides a secular touchstone by which to distinguish the relative values of teaching methods and curricula.

V

It is simply not viable to emphasize only the tangible and quantitative instruments in education while de-emphasizing the holism of life. Without the interpersonal connections, neither education nor communication is alive. Education needs meaningful themes and passion (always present in those real and memorable encounters in life) to be attractive. It is emotional connectedness that IS "real life"--it needs to be present in education and communication.

Although the "soft" approach to constructive environmental use, education, and, obviously, interpersonal relationships, has often been equated with "holistic," hard technology is certainly not necessarily opposed to humanization. Indeed, as French author and politician Servan-Schreiber and others have shown, the microchip revolution has the potential of being the vehicle with which the developing countries can leapfrog into the post-industrial age.[43] Even now, many remote villages have satellite dishes, thus not only affording access to national or world-wide programming, but also interactive capabilities which can bring individual educational programs and experiences to everyone.

The critical factor, of course, is awareness of the mandate for holistic education. This both depends upon and determines what is communicated through the electronics. Here is where values and education come into play. In any case, our will is the intervening factor. If we continue to "make the machines as human as possible"--that is, "user friendly" (if indeed this is really being human today)--part of that research effort should certainly be to expand the parameters of the "as human..." for people even as we are in the process of defining the "...as possible" for the machines. In other words, we are technologizing the

computers towards "being more human," so let us not leave our definition and conception of "human" to tacit understanding.

In defining our humanity, we have marvelous tools to use. Computing and communication electronics, unlike humans, have no will to determine to what ends we employ them. The "pathways of light" in modern games and communications are sublte manifestations. They can be regarded in various ways. C.S. Lewis had no computer display when he wrote:

> ...light is on the edge--
> the last thing we know
> before things become too
> swift for us.[44]

Notes

(Full publication information for these citations will be found in the References.)

1. Fuller (1981), p. 131.

2. Fuller (1981), Ch. 6.

3. Kuhn (1962), Ch. XIII and pp. 121, 179, and 208-209.

4. "Crucial problems" refers to the types of problems discussed by Capra (1982) in a chapter titled "The Dark Side of Growth" in which he writes about the harmful by-products of expansion such as toxic wastes and their effects. Also see The Global 2000 Report to the President, Vol. One.

5. Capra (1982).

6. Ibid., p. 47.

7. Ibid., Ch. 3.

8. Ibid., p. 38.

9. Ibid., p. 61. Also Bohm (1980), p. 113 and 125.

10. Capra (1982), p. 265.

11. Ibid., Ch. 9. Also Bohm (1980), p. 32.

12. Thomas (1974), p. 4.

13. Schumacher (1973), p. 44 and pp. 46-47.

14. Bohm (1980), p. xi.

15. Capra (1982), p. 96.

16. Bohm (1980), pp. 138-139.

17. Illich (1970), p. 152.

18. Fuller (1980) and Freire (1970).

19. Illich (1970), p. 153.

20. Postman (1982).

21. Hirschfeld (1957), p. 75. Also Bohm (1980), pp. ix-26.

22. See Directory for a New World and The L.A. Light Directory and Forum.

23. Richardson (1983), pp. 19-20 and p. 23.

24. See "A Center Report: Cults and the Constitution," The Center Magazine, Vol. XV No. 2, March/Arpil 1982. Also Greenfield (1975).

25. May (1969), p. 22.

26. Ibid., p. 160.

27. Penelope Spheeris's acclaimed documentary film "The Rise and Fall of Western Civilization" allows one to observe slam-dancing from a more detached perspective.

28. Fuller (1980), p. xxxiv. For the definition of "Obnoxico," see p. 226. He includes such items as "acrylic toilet seats with dollar bills cast in the transparent plastic material" and "two teddy bears hugging an alligator." Also included are such things as plastic flowers or plastic pebbles for one's garden walk. He says, "Private enterprise is now building airports with ever-longer walkways and hotels with ever-increasing numbers of levels of ground-floor and basement arcades to accommodate the ever more-swiftly multiplying Onboxico stores."

29. Boykin (1982). There are numerous news articles concerning contaminated drinking water that could be cited in support of the notion that hydrological education is warranted.

30. It is well beyond the scope of this paper, but evidence supporting this statement can literally be found in any newspaper. For instance, it was recently widely reported that federal sulfer emission requirements have been relaxed (factor in acid rain).

31. Illich (1981).

32. Illich (1970).

33. For a detailed, timely, and logical analysis of the notion of "relevance," see Bohm (1980), Ch. 2. Also Van Til (1956), p. 345 and (1969), pp. 14-17.

34. Freire (1970), p. 95.

35. Capra (1982); Bohm (1980), p. 32; and Tompkins and Bird (1973), p. 86, 96, and 100.

36. Zigler (1978), p. 318.

37. For a more comprehensive treatment of holistic curriculum see my unpublished manuscript "The Nature - Humanity Curriculum."

38. Capra (1982) and Bohm (1980).

39. Freire (1970).

40. Capra (1982), Ch. 9.

41. Maslow (1964), p. 82 and 83.

42. Ibid., p. 57.

43. Servan-Schreiber (1980).

44. Lewis (1943), p. 94.

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